Martinez
Refining Company

3485 Pacheco Boulevard
Martinez, CA 94553

September 30, 2020

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

Ms. Nadine Doughman
Department of Toxic Substances Control
Permitting Division
8800 Cal Center Dr.
Sacramento, CA 95826

Subject: Response to ESPO Memorandum
EPA ID NO: CAD009164021

Dear Ms. Doughman:

The purpose of this submittal is to respond to the Department of Toxic Substances Control (DTSC) Engineering and Special Projects Office Memorandum for the Dike Stability Assessment Report (ESPO Memo) dated February 21, 2020. The Martinez Refining Company (MRC) contracted with Simpson Gumpertz & Heger (SGH), an engineering firm, to address those comments related to the design of the surface impoundment with regards to the seismic requirements. The responses are included in Attachments B (SGH comments) and C (additional MRC comments).

Additionally, MRC is responding to the General Comment from the First Notice of Deficiency related to the physical and structural integrity of the ETP-1 surface impoundment. The items addressed in this comment can be summarized as:

- Concerns regarding the ability to meet the seismic requirements [22 CCR §66264.221(i); 22 CCR §66270.17(e)];
- Concerns regarding the ability to meet the 5' groundwater separation requirement [22 CCR §66264.113(d)(1)(E); 27 CCR §20240(c)]; and,
- The lack of a synthetic liner [22 CCR §66264.221(a)] – note that the previous owner was granted an exemption from the Minimum Technical Requirements.

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MRC has not been able to identify a feasible solution to meet the seismic, groundwater separation, and synthetic liner requirements.

Please contact Michael Monson at (925) 313-5516 or michael.monson@pbfenergy.com if you have any comments or questions regarding this information.

Sincerely,

Gordon Johnson
Manager, Environmental Affairs
Martinez Refining Company

cc: Certified Mail – Return Receipt Requested
Ms. Muzhda Ferouz
Acting Branch Chief, Permitting Division
Department of Toxic Substances Control
8800 Cal Center Dr.
Sacramento, CA 95826

Mr. Ryan Batty, P.E.
Permitting Division
Department of Toxic Substances Control
8800 Cal Center Dr.
Sacramento, CA 95826

Attachment A

Martinez
Refining Company

ATTACHMENT A

The following table provides an overview of which entity provided responses to the comments from the Department of Toxic Substances Control (DTSC) contained in the memorandum from the Engineering and Special Projects Office titled "Review of Appendix 2 – Dike Stability Assessment Report, RCRA Part B Permit Application for Pond 7."

SGH refers to Simpson Gumpertz & Heger Inc., an engineering firm that was contracted by the Martinez Refining Company LLC to assess the seismic stability of Pond 7. SGH's responses are included in Attachment B.

MRC refers to the Martinez Refining Company LLC. MRC's responses are included in Attachment C.

Comment #	SGH	MRC
1		X
2	X	X
3	X	
4	X	
5		X
6	X	
7	X	
8	X	X
9	X	
10	X	
11	X	
12	X	
13	X	X
14	X	X

Attachment B

SIMPSON GUMPERTZ & HEGER

Engineering of Structures
and Building Enclosures

21 September 2020

Mr. Michael Monson
Martinez Refining Company LLC
3485 Pacheco Blvd.
Martinez, CA 94553

Project 207530 – Response to DTSC Letter to Martinez Refining Company (MRC) dated February 26, 2020 regarding Recommendations for the ETP-1 Biotreater Dike Stability Assessment Report for Martinez Refining Company LLC, Martinez, California. EPA ID. No. CAD 009 164 021

Dear Mr. Monson:

At MRC's request, Simpson Gumpertz & Heger Inc. (SGH) has developed this response to address the referenced letter with review comments provided by the California Department of Toxic Substances Control (DTSC) regarding the 8 November 2017 SGH report on the dike stability assessment of the ETP-1 Biotreater (Pond 7) dikes.

The attachment to this letter contains specific SGH responses to each comment made by DTSC.

If you have any questions or comments regarding the contents of this letter, please feel free to call the undersigned.

Sincerely yours,
SIMPSON GUMPERTZ & HEGER INC

Gayle S. Johnson

Gayle S. Johnson, P.E.
Senior Principal
CA License No. C36658

Encls.

SGH Response to the DTSC February 26, 2020 Letter Comments

9/21/20

SGH Response to DTSC Comments

The following comments and responses use the same number and letter system as in the DTSC letter.

DTSC Letter Comment 1

1. **Section 2.3.1 Shell Soil Report No. 42—Harding-Lawson Associates, "Soil Investigation, Proposed Clarification Pond, Storm Water Storage basin and Related Pumping Facilities, Shell Oil Company Martinez Refinery, Martinez, California," dated 30 January 1970.** The last (19th) bullet states that high groundwater is anticipated to be about elevation +7 feet. The text further states that fluctuations in groundwater levels could occur due to changes in tides, season, and variation in rainfall and other factors. We note that sea level rise also may influence future groundwater levels. The State of California Sea-Level Rise Guidance 2018 Update should be used in evaluating sea-level rise. We further note that Figure 3 Dike Typical Section shows the bottom of the Pond 7 at elevation +5 feet, which means the Pond 7 may have two feet of groundwater. The text should be expanded/revised to include highest anticipated groundwater level during the expected design life of the surface impoundment and the effects/impacts of mixing groundwater with the wastewater.

SGH Response

The SGH report date 8 November 2017 is limited to an assessment of dike stability. Surface and groundwater hydrology were beyond the scope of the assessment.

Sea Level Rise does not impact the dike stability assessment; however, it is appropriate to consider Sea Level Rise relative to future assessments of a facility upgrade or replacement.

DTSC Letter Comment 2

2. **Section 2.3.1 Shell Soil Report No. 42—Harding-Lawson Associates, "Soil Investigation, Proposed Clarification Pond, Storm Water Storage basin and Related Pumping Facilities, Shell Oil Company Martinez Refinery, Martinez, California," dated 30 January 1970.** The fifth (last) bullet in the subsection titled Shell Oil Report No. 51 – Harding-Lawson Associates, "Investigation of Seepage Aeration Basin – Areas C3, C4, D3 and D4, Shell Oil Company Martinez Refinery, Martinez, California," dated 2 December 1971 states that an 18- to 30-inch deep subdrain to collect seepage emerging from the toe of the dike was recommended. However, it is not clear if the subdrain was constructed. The text should be expanded/revised to indicate if the recommended subdrain was constructed.

SGH Response

We have seen no evidence that the subdrain was installed and assume it is not present.

DTSC Letter Comment 3

3. **Section 2.4.1 Woodward-Clyde Consultants, "Evaluation of Holocene Faulting in Vicinity of the CO Boiler Waste Feed Tank Shell Oil Company Martinez Refiner, Martinez, California," dated 12 May 1989.** We note that this report was issued almost 31 years ago, and the information in it is likely outdated. The report should be reviewed against current knowledge and practices in the seismic practice and any deficiencies should be addressed via an update or a new report.

SGH Response

The current USGS maps showing Quaternary Faults do not indicate known or suspected faults through this facility.

Figure 1 below shows a portion of the USGS interactive fault maps available online through the USGS website. The nearest fault is the main trace of the Concord Fault (in Red), approximately 2 miles to the E-NE of the site.

Pond 7 is near the center of the image. The nearest fault is to the east and does not trend toward the site.

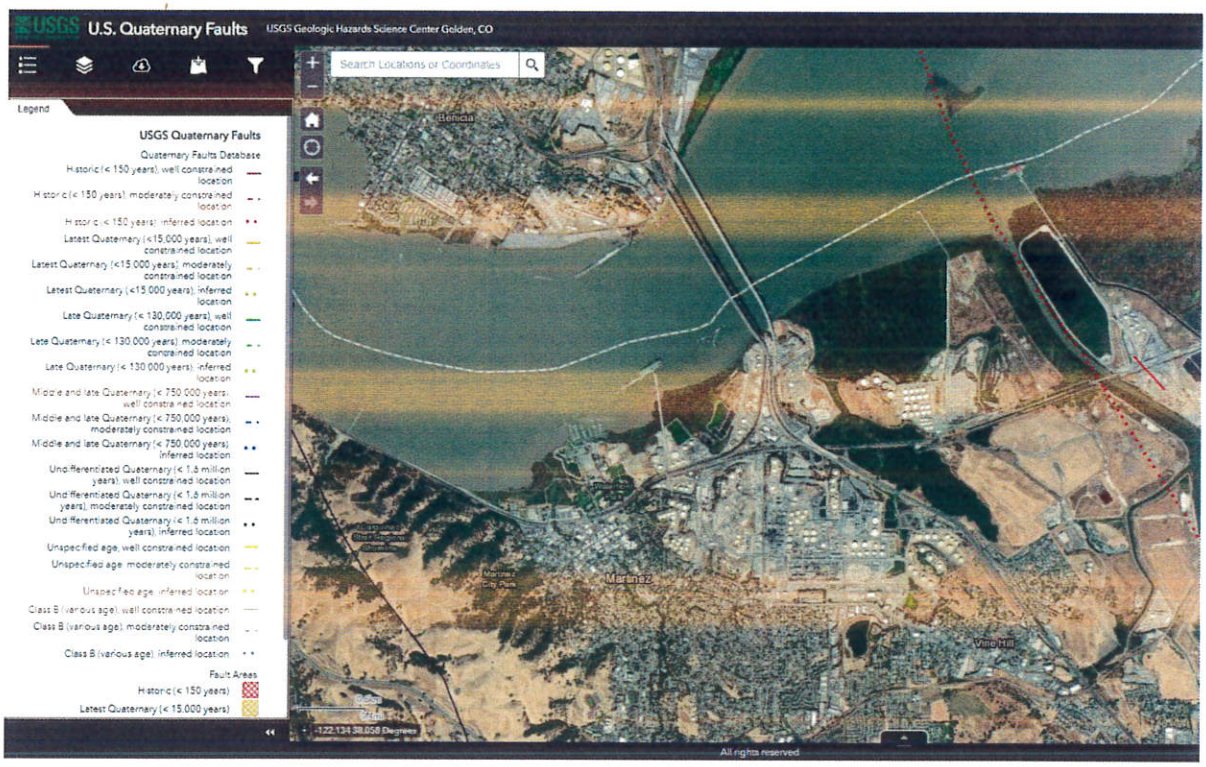

Figure 1: U.S. Geological Survey and California Geological Survey, Quaternary fault and fold database for the United States, accessed June 8, 2020, at: https://www.usgs.gov/natural-hazards/earthquake-hazards/faults.

DTSC Letter Comment 4

4. **Section 2.5.1 ASCE 7-10, "Minimum Design Loads for Buildings and Other Structures".** The text refers to the 2016 California Building Code (CBC) and ASCE 7-10. We note that the 2016 CBC was in use at the time the Report was prepared, and sufficient time has now passed, such that the 2019 CBC is the current code, which now references ASCE 7-16. The first and second bullets show Site Class E in accordance with ASCE 7. However, our review of the attached boring logs indicate that more than ten feet of peat exists in some areas, which would classify the site as Site Class F under ASCE 7-16, Section 20.3 Site Class Definitions. The text should be revised/expanded to include the latest building code/ASCE 7 and details on how the Site Class was determined.

SGH Response

Our evaluation of site class was based on Table 20.3-1 of ASCE 7-10, which was in use at the time the report was prepared, along with our judgment and experience with similar sites at the refinery.

While strictly speaking, the site could be assigned to Site Class F due to the presence of liquefiable sand and peat deposits greater than 10 ft thick, we also recognize that the interpretation of a thick peat layer is based on very limited widely spaced sampling in the 1969 HLA borings. In the bayfront environment of the refinery, peat layers are generally thin and interspersed throughout the bay sediments. We believe that the interpretation of a thick peat layer is likely an artifact of approximate borehole logging procedures from that era.

Evaluation of site response for Site Class F requires complex nonlinear analyses that in our opinion were not warranted for the level of dike stability analysis performed. While consideration of Site Class F site responses has a significant impact on response at higher periods, the evaluation of dike stability is based on PGA. For these conditions, the site amplification factor (the ratio of site response for a given Site Class relative to Site Class B/C) at the PGA is generally about 1 for either Site Class E or F.

Thus, Site Class E was considered to provide a reasonable value for the stability analysis performed and a site response analysis would not change our conclusions on the expected dike stability.

Due to changes in the California Building Code effective 1 January, 2020, detailed site response analyses will likely be required for design of facility upgrades or replacement.

DTSC Letter Comment 5

5. **Section 3.1.4 Content Load.** The second sentence states that typical Pond 7 operational water level is at elevation +14.0 feet (Shell datum). The top dike elevation has been indicated as elevation +16 feet (Shell datum). We note that 23 CCR §2548(a) requires surface impoundments to have sufficient freeboard to accommodate seasonal precipitation but in no case less than two feet. In addition, 22 CCR §66270.17(b) requires detailed plans and an engineering report on how the surface impoundment is operated and maintained to prevent overtopping. Compliance with these two regulatory requirements should be clearly demonstrated.

SGH Response

The evaluation of operational freeboard and accommodation of seasonal precipitation was beyond the scope of the dike stability assessment addressed in the report.

DTSC Letter Comment 6

6. **Section 3.1.5 Seismicity.** The second sentence refers to the "Maximum Considered Earthquake". However, we note that Title 22 of the California Code of Regulations (CCR) Section 66264.226(c)(3) refers to Maximum Credible Earthquake, as defined under 22 CCR Section 66260.10. The analysis should be revised to use the Maximum Credible Earthquake, unless it can be shown that the maximum considered earthquake is equivalent to or more conservative than the maximum credible earthquake.

SGH Response

ASCE 7 defines the Maximum Considered Earthquake ground motions associated with the lesser of the 2% in 50 year probabilistic and the mean plus one standard deviation deterministic earthquake (Maximum Credible Earthquake).

For this site, the Maximum Considered Earthquake is governed by the deterministic cap, thus the two earthquakes are the same.

DTSC Letter Comment 7

7. **Section 4.2.3 Soil Liquefaction and Associated Hazards.** The third sentence in the first paragraph states that there are no site-specific data suitable for liquefaction analysis and the authors conducted a qualitative liquefaction assessment based on soil descriptions in referenced boring logs. The first sentence in the second paragraph states that seismically induced settlement on the order of six inches should be anticipated under the Maximum Considered Earthquake due to post liquefaction recompression of liquefied soils. It is not clear how the six inches of settlement was determined from a qualitative analysis, particularly given the stated lack of suitable site-specific data for liquefaction analysis. A quantitative liquefaction assessment should be performed based on suitable site-specific data.

SGH Response

A rigorous quantitative liquefaction analyses requires SPT N-values, fines contents, or CPT results. These data are not available for the site.

The qualitative assessment liquefaction risk was based on the soil descriptions on the 1969 HLA boring logs, and our experience with similar Holocene bay sands around the San Francisco Bay.

The sands are described as saturated, loose to medium dense sands with Unified Soil Classification of SC, SM, and SP. These soil descriptions are consistent with typical highly liquefiable soils.

Seismic settlement estimates were made by assuming that the sands have a relative density of about 50%. Using post-liquefaction volumetric strain estimates for various initial relative density developed by Ishihara and Yoshimine (1992) we assume that the liquefiable sand would experience about 3.5% volumetric strain. For a maximum total sand thickness of 14 ft this would result in about 6 in. of liquefaction induced settlement.

We expect that additional investigation and liquefaction analysis would be conducted in support of future facility upgrades or replacement.

DTSC Letter Comment 8

8. **Section 4.3 Erosion and Piping.** The second sentence states that the dike has sustained some leakage in the past at pipe penetrations. The third and fourth sentences state that the leaks were addressed in the past. However, our direct observations during a site visit on November 13, 2019 indicate that seepage/leaks appear to still be occurring on at least two sides of the dike. We also observed flows along the landside dike toe into a sump equipped with an operating pump on the southwesterly side of the pond. We note that 22 CCR Section 66264.227(a)(2) states that a surface impoundment shall be removed from service in accordance with 22 CCR Section 66264.227(b) when the dike leaks.

SGH Response

At the time of the report, leakage had occurred at pipe penetrations and had been addressed.

The leakage described from the November 2019 DTSC site visit has occurred subsequent to the November 2017 report.

Seepage has now occurred at several dike locations. However, we have not observed areas of fines accumulation or other ground loss suggestive of ongoing backwards piping progression.

DTSC Letter Comment 9

9. **Section 4.4 Stability Analysis.** The first sentence in the first paragraph refers to a normal operating level of +12 feet (Shell datum). However, the text in Section 3.1.4 Content Load states that the typical operational level is +14 feet (Shell datum). The first sentence in the second paragraph opines that the stability analysis results are inherently conservative for the given conditions. However, we note that the text in Section 4.2.3 Soil Liquefaction and Associated Hazards states that there are no suitable site-specific data for liquefaction analysis and there appears to be limited site-specific soil strength data. Therefore, the analysis does not appear to be conservative or based on an appropriate record of empirical data. The text should be revised/expanded to include a basis for the assertion that the analysis is inherently conservative, or the assertion should be deleted/modified.

SGH Response

Our conclusion that the stability analyses are inherently conservative is based on our professional opinion based on what we believe is a conservative interpretation of limited subsurface data, the limitations of the pseudostatic analysis method and the site geometry.

In our opinion, the magnitude of the risk likely represents an upper bound assessment.

DTSC Letter Comment 10

10. **Section 4.4 Stability Analysis.** The third sentence in the second paragraph states that the dikes may undergo slope deformation exceeding several feet when subject to MCE level ground motions. The text further states that somewhat larger deformations should be expected if liquefaction occurs. Based on the foregoing statements, the dikes do not appear to meet the requirements of 22 CCR §66264.226(c)(3), which require an impoundment dike to not fail due to external or internal forces from a maximum credible earthquake.

SGH Response

We concluded that the dike walls will experience large displacements and damage. We concur that the dikes do not meet the requirement cited, requiring certification that any portion of any dike providing freeboard will not fail.

DTSC Letter Comment 11

11. **Section 4.4 Stability Analysis.** The third (last) sentence in the third paragraph states that the two to four feet of freeboard may mitigate the risk of the wastewater overtopping the dikes due to vertical dike crest deformations. However, as noted earlier the typical operating level only allows for two feet of freeboard. The stability analysis should be expanded/revised to include a numerical magnitude of the predicted dike crest deformations, with an overtopping evaluation based on the reduced typical operating freeboard.

SGH Response

This level of precision is not possible given the limited data available.

We believe that overtopping is possible in the event of an MCE or possibly a lower level event, depending on the operating level at the time of the earthquake.

DTSC Letter Comment 12

12. **Section 4.4 Stability Analysis.** The fifth paragraph refers to the Maximum Considered Earthquake with a 2475-year return period. The second (last) sentence in the same paragraph states that the 2475-year return period earthquake event was introduced into the building codes in the last few years. However, we note that 22 CCR §66264.226(c)(3) refers to the maximum credible earthquake which is defined in 22 CCR §66260.10 in terms of the presently known tectonic framework and all known geologic and seismologic facts. Moreover, the time factor (known or expected frequency of occurrence) shall not be a parameter in the Maximum Credible Earthquake, as defined by 22 CCR §66260.10. The current tectonic framework for California is the third Uniform California Earthquake Rupture Forecast (UCERF3) issued in 2015. Seismic hazards such as liquefaction, ground shaking, tsunamis/seiches, landslides/slope instability, and lateral spreading should be based on site-specific data using UCERF3 and the latest Ground Motion Prediction Equations (GMPEs) based on Next Generation Attenuation (NGA) West 2 version.

SGH Response

See also the response to Comment 6, indicating that the Maximum Considered Earthquake and Maximum Credible Earthquake are likely the same.

Our report was prepared in November 2017, when ASCE 7-10 was the governing code in California.

We have updated our assessment of MCE ground motions based on ASCE 7-16. These ground motions are based on UCERF3 and the NGA West 2 version Ground Motion Prediction Equations. The results indicate a PGA_M = 0.625 g. This is governed by a deterministic PGA_D = 0.535 g and a Site Modification Factor at PGA of 1.165.

This represents an approximate 7% increase in ground motion relative to the analyses presented in our report and will not materially change the conclusions drawn from our 2017 analyses.

DTSC Letter Comment 13

13. **Section 5 Conclusions.** The third bullet states that the Biotreater dike will experience large displacements and damage to the dike walls during the Maximum Considered Earthquake. However, the analysis should be based on the maximum credible earthquake as required in 22 CCR §66264.226(c)(3). Although we do not expect the conclusion to change significantly using the Maximum Credible Earthquake, we note that the dike stability does not meet the stated regulatory requirement, as analyzed. The dike will require modifications to meet the regulatory requirements.

SGH Response

Please see previous responses to Comments 6 and 12 regarding the earthquake definition not changing results or conclusions.

Please see our previous response to Comment 10, with our concurrence that the dikes do not meet the requirement cited, requiring certification that any portion of any dike providing freeboard will not fail. We concur that modification or replacement will be required to meet the regulatory requirements.

DTSC Letter Comment 14

14. **Section 5 Conclusions.** The fourth bullet states that the dike has much lower risk of significant damage from earthquakes on the order of the original seismic design criteria. However, we note that as defined in 22 CCR §66260.10 the maximum credible earthquake is based on presently known seismic and tectonic framework. This conclusion would appear to be unwarranted for the current conditions and requirements.

SGH Response

This statement was only intended to provide Shell additional information related to the expected performance relative to the original seismic design criteria. The statement does not address compliance with regulatory requirements or performance with the presently known seismic hazards.

Attachment C

Martinez
Refining Company

ATTACHMENT C

Comment 1: Section 2.3.1 Shell Soil Report No. 42 – Harding-Lawson Associates, "Soil Investigation, Proposed Clarification Pond, Storm Water Storage basin and Related Pumping Facilities, Shell Oil Company Martinez Refinery, Martinez, California," dated 30 January 1970. The last (19th) bullet states that high groundwater is anticipated to be about elevation +7 feet. The text further states that fluctuations in groundwater levels could occur due to changes in tides, season, and variation in rainfall and other factors. We note that sea level rise also may influence future groundwater levels. The State of California Sea-Level Rise Guidance 2018 Update should be used in evaluating sea-level rise. We further note that Figure 3 Dike Typical Section shows the bottom of the Pond 7 at elevation +5 feet, which means the Pond 7 may have two feet of groundwater. The text should be expanded/revised to include highest anticipated groundwater level during the expected design life of the surface impoundment and the effects/impacts of mixing groundwater with the wastewater.

MRC Response: In 2019, the refinery submitted a Flood Protection Report 2019 Update to the California Regional Water Quality Control Board – San Francisco Bay Region. This report followed the State of California Sea-Level Rise Guidance, 2018 Update. The report indicates that although the height of the Pond 7 dike would be expected to not be inundated by a projected five foot sea level rise (the 2050 elevation under the H++ scenario), the control room and roads surrounding the pond would be flooded, which would impact operation of the ETP-1 Biotreater.

More recent groundwater elevation data identifies that the highest groundwater elevation adjacent to Pond 7 (wells 225R, 292B and 299FBS) ranges from 8.3 to 10.8 feet. MRC will include both the Flood Protection Report and the highest groundwater elevation in the revised application.

Comment 2: Section 2.3.1 Shell Soil Report No. 42 – Harding-Lawson Associates, "Soil Investigation, Proposed Clarification Pond, Storm Water Storage basin and Related Pumping Facilities, Shell Oil Company Martinez Refinery, Martinez, California," dated 30 January 1970. The fifth (last) bullet in the subsection titled Shell Oil Report No. 51 – Harding-Lawson Associates, "Investigation of Seepage Aeration Basin – Areas C3, C4, D3 and D4, Shell Oil Company Martinez Refinery, Martinez, California," dated 2 December 1971 states that an 18- to 30-inch deep subdrain to collect seepage emerging from the toe of the dike was recommended. However, it is not clear if the subdrain was constructed. The text should be expanded/revised to indicate if the recommended subdrain was constructed.

MRC Response: Neither MRC nor SGH have found evidence that the subdrain was constructed.

ATTACHMENT C

Comment 3: Section 2.4.1 Woodward-Clyde Consultants, "Evaluation of Holocene Faulting in Vicinity of the CO Boiler Waste Feed Tank Shell Oil Company Martinez Refinery, Martinez, California," dated 12 My 1989. We note that this report was issued almost 31 years ago, and the information in it is likely outdated. The report should be reviewed against current knowledge and practices in the seismic practice and any deficiencies should be addressed via an update or a new report.

MRC Response: Please refer to Attachment A for comments from Simpson Gumpertz & Heger Inc (SGH) regarding this item.

Comment 4: Section 2.5.1 ASCE 7-10, "Minimum Design Loads for Buildings and Other Structures." The text refers to the 2016 California Building Code (CBC) and ASCE 7-10. We note that the 2016 CBC was in use at the time the Report was prepared, and sufficient time has now passed, such that the 2019 CBC is the current code, which now references ASCE 7-16. The first and second bullets show Site Class E in accordance with ASCE 7. However, our review of the attached boring logs indicate that more than ten feet of peat exists in some areas, which would classify the site as Site Class F under ASCE 7-16, Section 20.3 Site Class Definitions. The text should be revised/expanded to include the latest building code/ASCE 7 and details on how the Site Class was determined.

MRC Response: Please refer to Attachment A for comments from SGH regarding this item.

Comment 5: Section 3.1.4 Content Load. The second sentence states that typical Pond 7 operational water level is at elevation +14.0 feet (Shell datum). The top dike elevation has been indicated as elevation +16 feet (Shell datum). We note that 23 CCR §2548(a) requires surface impoundments to have sufficient freeboard to accommodate seasonal precipitation but in no case less than two feet. In addition, 22 CCR §66270.17(b) requires detailed plans and an engineering report on how the surface impoundment is operated and maintained to prevent overtopping. Compliance with these two regulatory requirements should be clearly demonstrated.

MRC Response: MRC operates Pond 7 with a minimum freeboard of 2 feet, which is sufficient to accommodate seasonal precipitation as the Pond operates on level control.

Prevention of overtopping is managed by level indication and an associated high and high-high level alarm in the Effluent Treatment Plant (ETP) Total Distributed Control (TDC) board. The output from the level indication is maintained in the data historian. The high-high level

ATTACHMENT C

alarm is set at two feet of freeboard. Additionally, the ETP operator visually monitors the level during operator rounds, and reduces the level as needed.

MRC will provide an engineering report to address the design, operation and maintenance of the surface impoundment to assure sufficient freeboard to prevent overtopping.

Comment 6: Section 3.1.5 Seismicity. The second sentence refers to the "Maximum Considered Earthquake." However, we note that Title 22 of the California Code of Regulations (CCR) Section 66264.226(c)(3) refers to Maximum Credible Earthquake, as defined under 22 CCR Section 66260.10. This analysis should be revised to use the Maximum Credible Earthquake, unless it can be shown that the maximum considered earthquake is equivalent to or more conservative than the maximum credible earthquake.

MRC Response: Please refer to Attachment A for comments from SGH regarding this item.

Comment 7: Section 4.2.3 Soil Liquefaction and Associated Hazards. The third sentence in the first paragraph states that there are no site-specific data suitable for liquefaction analysis and the authors conducted a qualitative liquefaction assessment based on soil descriptions in referenced boring logs. The first sentence in the second paragraph states that seismically induced settlement on the order of six inches should be anticipated under the Maximum Considered Earthquake due to post liquefaction recompressions of liquefied soils. It is not clear how the six inches of settlement was determined from a qualitative analysis. A quantitative liquefaction assessment should be performed based on suitable site-specific data.

MRC Response: Please refer to Attachment A for comments from SGH regarding this item.

Comment 8: Section 4.3 Erosion and Piping. The second sentence states that the dike has sustained some leakage in the past at pipe penetrations. The third and fourth sentences state that the leaks were addressed in the past. However, our direct observations during a site visit on November 13, 2019 indicate that seepage/leaks appear to still be occurring on at least two sides of the dike. We also observed flows along the landside dike toe into a sump equipped with an operating pump on the southwesterly side of the pond. We note that 22 CCR Section 66264.227(a)(2) states that a surface impoundment shall be removed from service in accordance with 22 CCR Section 66264.227(b) when the dike leaks.

MRC Response: The seepage identified during the November 2019 DTSC site visit was due to scouring that occurred due to sloughing of the internal rip-rap lining at the northwest corner of the pond. To address the seepage, MRC moved the mixer that was closest to the

ATTACHMENT C

corner, lowered the level in Pond 7 (to reduce head pressure), and added rip rap to replace what had sloughed off.

The flow on the southwest side of the pond was due to a leaking valve seat on the treated effluent piping that has since been repaired. The sump was a temporary installation.

Comment 9: Section 4.4 Stability Analysis. The first sentence in the first paragraph refers to a normal operating level of +12 feet (Shell datum). However, the text in Section 3.1.4 Content Load states that the typical operational level is +14 feet (Shell datum). The first sentence in the second paragraph opines that the stability analysis results are inherently conservative for the given conditions. However, we note that the text in Section 4.2.3 Soil Liquefaction and Associated Hazards states that there are no suitable site-specific data for liquefaction analysis and there appears to be limited site-specific soil strength data. Therefore, the analysis does not appear to be conservative or based on an appropriate record of empirical data. The text should be revised/expanded to include a basis for the assertion that the analysis is inherently conservative, or the assertion should be deleted/modified.

MRC Response: Please refer to Attachment A for comments from SGH regarding this item.

Comment 10: Section 4.4 Stability Analysis. The third sentence in the second paragraph states that the dikes may undergo slope deformation exceeding several feet when subject to MCE level ground motions. The text further states that somewhat larger deformations should be expected if liquefactions occurs. Based on the forgoing statements, the dikes do not appear to meet the requirements of 22 CCR §66264.226(c)(3), which require an impoundment dike to not fail due to external or internal forces from a maximum credible earthquake.

MRC Response: Please refer to Attachment A for comments from SGH regarding this item.

Comment 11: Section 4.4 Stability Analysis. The third (last) sentence in the third paragraph states that the two to four feet of freeboard may mitigate the risk of the wastewater overtopping the dikes due to vertical dike crest deformations. However, as noted earlier the typical operating level only allows for two feet of freeboard. The stability analysis should be expanded/revised to include a numerical magnitude of the predicted dike crest deformations, with an overtopping analysis based on the reduced typical operating freeboard.

MRC Response: Please refer to Attachment A for comments from SGH regarding this item.

ATTACHMENT C

Comment 12: Section 4.4 Stability Analysis. The fifth paragraph refers to the Maximum Considered Earthquake with a 2475-year return period. The second (last) sentence in the same paragraph states that the 2475-year return period earthquake event was introduced into the building codes in the last few years. However, we note that 22 CCR §66264.226(c)(3) refers to the maximum credible earthquake which is defined in 22 CCR §66260.10 in terms of the presently known tectonic framework and all known geologic and seismologic facts. Moreover, the time factor (known or expected frequency of occurrence) shall not be a parameter in the Maximum Credible Earthquake, as defined by 22 CCR §66260.10. The current tectonic framework for California is the third Uniform California Earthquake Rupture Forecast (UCERF3) issued in 2015. Seismic hazards such as liquefaction, ground shaking, tsunamis/seiches, landslides/slope instability, and lateral spreading should be based on site-specific data using UCERF3 and the latest Ground Motion Prediction Equations (GMPEs) based on Next Generation Attenuation (NGA) West 2 version.

MRC Response: Please refer to Attachment A for comments from SGH regarding this item.

Comment 13: Section 5 Conclusions. The third bullet states that the Biotreater dike will experience large displacements and damage to the dike walls during the Maximum Considered Earthquake. However, the analysis should be based on the maximum credible earthquake as required in 22 CCR §66264.226(c)(3). Although we do not expect the conclusion to change significantly using the Maximum Credible Earthquake, we note that the dike stability does not meet the stated regulatory requirement, as analyzed. The dike will require modifications to meet the regulatory requirements.

MRC Response: MRC concurs that the dike does not meet the requirement cited, and that modification or replacement will be required to meet the regulatory requirements.

Comment 14: Section 5 Conclusions. The fourth bullet states that the dike has a much lower risk of significant damage from earthquakes on the order of the original seismic design criteria. However, we note that as defined in 22 CCR §66260.10 the maximum credible earthquake is based on presently known seismic and tectonic framework. This conclusion would appear to be unwarranted for the current conditions and requirements.

MRC Response: MRC agrees that the statement does not address compliance with regulatory requirements or performance with the presently known seismic hazards.